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10/738,471	12/17/2003	Claude Q.C. Hayes	97661.00020	8199

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MCCARTER & ENGLISH , LLP STAMFORD OFFICE
FINANCIAL CENTRE , SUITE 304A
695 EAST MAIN STREET
STAMFORD, CT 06901-2138

EXAMINER	
BRUENJES, CHRISTOPHER P	
ART UNIT	**PAPER NUMBER**
1794	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/738,471	HAYES, CLAUDE Q.C.	
	Examiner	Art Unit	
	Christopher P. Bruenjes	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5-24,26 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-24,26 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-2, 5-8, 10-13, 20, 22, 24, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salyer (USPN 5,370,814) in view of Pedersen et al (USPN 4,543,281).

Regarding claims 1, 22, 24, and 26, Salyer teaches in combination a flight data recorder (reference number 20, Figure 2 and abstract) within an inner housing (reference number 22, Figure 2), which is surrounded and embedded within a powder-like mix of silica particles and phase change material (reference number 30, Figure 2 and abstract). The silica particles or outer housing (reference number 14, Figure 2) represent the support means for supporting the phase change material. The phase change material includes salt hydrates (col.2, l.54-56).

Salyer fail to teach using a hydroxide as the phase change material. However, aluminum hydroxide is a salt hydrate and Pedersen et al teach that aluminum hydroxide is a preferred endothermic material for use in fire or flame barrier articles, such as the article of Salyer, because the dehydration and decomposition of the aluminum hydroxide absorbs large quantities of heat per amount of aluminum hydroxide (col.2, l.8-55). One of ordinary skill in the art would have recognized that Salyer and Pedersen et al are analogous insofar as both references are concerned with forming fire or flame barrier material for protecting heat sensitive devices. Therefore, one of ordinary skill in the art would have recognized that aluminum hydroxide is used as a phase change material or endothermic material for providing a fire or flame barrier for a heat sensitive device, since it absorbs large quantities of heat per amount of material, as taught by Pedersen et al.

Thus, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to select aluminum hydroxide as the salt hydrate phase change material of Salyer, since it is a preferred material for the purpose of providing a fire or flame barrier to heat sensitive devices based on its endothermic properties during decomposition, as taught by Pedersen et al. Furthermore, the hydroxide affects the level of heat absorption at least in part based on an irreversible decomposition of said hydroxide, in which the hydroxide is dehydrated (col.3, l.56-64). The heat absorption by the hydroxide inherently protects the electronics within the flight data recorder from damage based upon exposure to a predetermined level of heat exposure, since any substance between the electronics and the heat source that absorbs heat would protect the electronics from the heat. When aluminum hydroxide irreversibly decomposes it forms a thermal insulation oxide layer because that is a property of aluminum

hydroxide. Therefore, the aluminum hydroxide of Gregg et al when irreversibly decomposed will also form a thermal insulation oxide layer around the flight data recorder.

Regarding claim 2, Salyer teaches that the phase change material is supported by a retaining matrix such as silica powder and/or and enclosure or structure, such as the outer housing of the device.

Regarding claims 3-8, Salyer teaches that the phase change material is supported by a flexible substrate of silica that conforms to the shape of a heat sensitive device, and is supported between the inner housing and outer housing of the device, so that the material surrounds and embeds within it the heat sensitive device. Furthermore, the heat sensitive device is spaced from the material by the inner housing wall.

Regarding claim 20, Pedersen et al teach that the hydroxide is aluminum hydroxide.

Regarding claim 10, Salyer teaches the article comprises the inner housing which is a layer of housing between said heat sensitive device and said support means.

Regarding claim 11, Salyer teaches the article further comprises at least one layer of insulation placed between said support means and a source of heat (col.7, 21-25).

Regarding claims 12 and 13, Salyer teaches that the article further comprises a hermetic seal (reference number 14, Figure 2) surrounding said support means that includes a vent (reference number 15, Figure 2) (col.7, l.55-63).

4. Claims 9, 17-19, 23, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salyer in view of Pedersen et al as applied to claims 1, 22, and 24 above, and further in view of Lamon et al (USPN 5,453,453).

Salyer and Pedersen et al teach all that is claimed in claims 1, 22, and 24 as shown above, but fail to teach using magnesium, calcium, or beryllium hydroxide as the hydroxide. However, Lamon et al teach that when forming fire or flame barrier material for protecting metal, plastic and composite parts, such as the material of Pedersen et al, alkaline earth metal hydroxides and aluminum group hydroxides are interchangeable (col.2, l.20-25). One of ordinary skill in the art would have recognized that Salyer, Pedersen et al and Lamon et al are analogous insofar as both references are concerned with forming fire barrier material for the protection of metal, plastic, and composite parts.

Therefore, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to substitute any alkaline earth metal hydroxide, such as magnesium, calcium, or beryllium hydroxides, for the aluminum hydroxide of Pedersen depending on the desired end result of the article, since each hydroxide will have a different temperature at which it decomposes.

5. Claims 9, 14-16, 23, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salyer in view of Pedersen as applied to claims 1, 22, and 24 above, and further in view of Lamon et al and Claar et al (USPN 4,421,661).

Salyer and Pedersen et al teach all that is claimed in claims 1, 22, and 24 as shown above, but fail to explicitly teach using Lithium, Sodium or Potassium hydroxide as the hydroxide of the fire barrier material. However, Lamon et al teach that other hydroxides such as alkaline earth metal hydroxides are interchangeable with aluminum hydroxide, all of the metallic hydroxides absorb large quantities of heat, and that the particular hydroxide is chosen depending on the

specific temperature desired. Claar et al goes on to teach that not only alkaline earth metal hydroxides, but also alkaline metal hydroxides, such as lithium, sodium, and potassium hydroxides, also absorb large quantities of heat and are chosen depending on the specific temperature desired (see abstract). One of ordinary skill in the art would have recognized that all four references are analogous insofar as they are all concerned with the endothermic heat properties and heat absorption of metal hydroxides.

Therefore, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to substitute Lithium, Sodium, or Potassium hydroxides for the aluminum hydroxide of Pedersen et al depending on the intended end use of the article since it has been shown by Lamon et al and Claar et al that alkali metal, alkaline earth metal, and aluminum hydroxides are all interchangeable as heat absorbers depending on the desired temperature level of the endothermic property.

6. Claims 9, 21, 23, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salyer in view of Pedersen as applied to claims 1, 22, and 24 above, and further in view of Lamon et al and Lem et al (USPN 5,167,876).

Salyer and Pedersen et al teach all that is claimed in claims 1, 22, and 24 as shown above, but fail to explicitly teach using ammonium hydroxide as the hydroxide of the fire barrier material. However, Lamon et al teach that other hydroxides such as alkaline earth metal hydroxides are interchangeable with aluminum hydroxide, all of the metallic hydroxides absorb large quantities of heat, and that the particular hydroxide is chosen depending on the specific temperature desired. Lem et al goes on to teach that not only alkaline earth metal hydroxides,

such as magnesium hydroxide and calcium hydroxide taught in Lamon et al, but also ammonium hydroxide absorb large quantities of heat and are chosen depending on the specific temperature desired (col.20, l.46 – col.21, l.37). One of ordinary skill in the art would have recognized that all four references are analogous insofar as they are all concerned with the endothermic heat properties and heat absorption of materials for use as fire barrier materials.

Therefore, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to substitute ammonium hydroxide for the aluminum hydroxide of Pedersen et al depending on the intended end use of the article since it has been shown by Lamon et al and Lem et al that ammonium hydroxide, alkaline earth metal, and aluminum hydroxides are all interchangeable as heat absorbers depending on the desired temperature level of the endothermic property.

Response to Arguments

7. Applicant's arguments regarding the 35 U.S.C. 103 rejections of claims 1,2, 5-24 and 26-27 over Salyer in view of Pedersen with or without Lamon et al, Claar et al, and/or Lem et al.

In response to Applicant's argument that the proposed combination lacks teaching that heat absorption is through irreversible decomposition of a hydroxide or that a thermal insulation oxide layer is formed. Pedersen et al specifically teaches that the aluminum oxide absorbs heat through an irreversible decomposition and that the aluminum oxide forms a thermal insulation oxide layer after completely decomposing (col.2, l.8-55).

In response to Applicant's argument that Salyer and Peterson are inconsistent because Salyer teaches venting of phase change materials, Salyer is describing materials that change from

solid to liquid and eventually gas and therefore require venting to vent the heated gas. However, Pedersen et al teach that aluminum hydroxide is used in place of known PCMs because it absorbs large quantities of heat per amount of material. Salyer and Peterson when taken as a whole teach one of ordinary skill in the art that the aluminum hydroxide taught in Pederson is a preferred chemical for protecting heat sensitive items because it absorbs large quantities of heat per amount of material. This ability to absorb large quantities of heat per amount of material would be especially critical to one in the art of flight data recorders because there is always a concern of weight and space when building components for an airplane. With regard to the issue that Salyer teaches venting and aluminum hydroxide would not require venting, while although aluminum hydroxide would not evaporate and vent there might be a desire for the water by-product from the decomposition of aluminum hydroxide to vent and allow additional heat to vent with it, the aluminum hydroxide would leave behind aluminum oxide as taught by Pedersen et al.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher P. Bruenjes whose telephone number is 571-272-1489. The examiner can normally be reached on Monday thru Friday from 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on 571-272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Christopher P Bruenjes
Examiner
Art Unit 1794

CPB

CPB
January 17, 2008

ALICIA CHEVALIER
PRIMARY EXAMINER